

REFREX® 1400 WOVEN FABRICS

Refrex® 1400 woven fabrics consist of endless metal oxides filaments without the aid of organic, glass or metal inserts.

Refrex® 1400 woven fabrics have a mullite composition with 2 % added boria. **Refrex® 1400** fabrics retain strength and flexibility with little shrinkage at continuous temperatures up to 1370 °C.

Refrex® 1400 woven fabrics represent a major advancement in refractory technology.



These truly endless metal oxides filaments can be readily converted into ceramic textiles which meet tough performance requirements in high temperature operating environments.

General characteristics

- Non-oxidizing
- Non-hygroscopic
- Essentially chemically resistant
- Low thermal conductivity
- Good abrasion resistance.

Typical Applications:

- * Mono- and Multi Tube Bellows; high temperature resistant flexible seals for tube penetrations through roofs, bottoms or walls of Cracking Furnaces, Reformers, Platformers, Visbreakers and the real majority of all types of circular and box type heaters.
- * Radiation Shields, manifold protection shields in reformers; for protection of welded joints, reducers, cracking tubes or coils exposed to excessive heat, tube supports, coil hanging lugs etc.
- * Heatshields for heat flux reduction for overheated process coils
- * REL/RNL dust free hot face linings in sanitary kilns
- * Tadpole thermal gaskets and special shaped thermal seals.
- * Furnace curtains and zone dividers.
- * Furnace- and duct- linings.
- * Expansion joints.
- * Temporary Fire Walls for hot furnace repairs.

It is strongly recommended to apply **Refrex® 1400** types of yarn and **Refrex® 1400** Tie-Cords to sew and/or fix **Refrex® 1400** in several applications or products. In this way the products are made from 100% **Refrex® 1400**!

Refrex 1400 fabrics are not limited in use caused by H&S regulations.

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Typical Properties:

| Style | Weight ¹ (sized) | Available Widths | Thick- ness ² | Thread Count ³ | | Yarn Type | | Air ⁶ Per- meability $\frac{m^3}{m^2/min}$ | Weave | Breaking Strength <u>w/o sizing</u> | |
|----------|--------------------------------|--------------------------|-----------------------------|------------------------------|------------|-------------------|-------------------|---|-------------------|---|------|
| | | | | Warp cm | Fill cm | Warp | Fill | | | Warp | Fill |
| RF-1420 | 505 g/m ² | 0.91/1.6 m ^{1*} | 0.51 mm | 12 | 10 | Rov. ⁴ | Rov. ⁴ | 4.6 | 5Harness Satin | 45 | 39 |
| RF-1430 | 695 g/m ² | 0.91/1.6 m ^{1*} | 0.76 mm | 8 | 8 | 1/2 | 1/2 | 10.7 | Crowfoot Satin | 52 | 46 |
| RF-1440* | 915 g/m ² | 0.91 m ¹ | 0.97 mm | 13 | 8 | 1/2 ⁵ | 1/2 ⁵ | n/a | 5Harness Satin | 36 | 23 |

*Non standard item, special order only

*With open selvage

1. ∇ 10%

2. ∇ 20%

3. ∇ 2 end and 2 picks per inch

4. 2,000 denier roving

5. 2,000 denier yarn

6. at 0.5 inch H₂O

Composition : 70% Al₂O₃ + 28% SiO₂ + 2% B₂O₃
 Colour : Coral (as supplied, coded sizing for identification versus Refrex® 1200)
 White (after first heating)
 Fiber length(Filaments) : Continuous
 Fiber density : 3.05
 Fiber diameter : 10 - 12 micron
 Surface area : < 1 m² /g

Mechanical Properties (filaments)

Tensile strength : 2070 MPa Tensile Modulus : 186 GPa
 Elongation : 1.1 %

Thermal Properties (filaments)

Continuous Use Temperature : 1370 °C Short Use Temperature(Peak) : 1650 °C
 Linear Shrinkage : < 1 % (at 1593 °C) Melting Point : 1800 °C

Thermal Expansion Coefficient

25 – 500°C : 4.38 x 10⁻⁶ Δ L/L °C
 25 – 1000°C : 4.99 x 10⁻⁶ Δ L/L °C
 Specific Heat : 0.27 Cal/g/°C

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Electrical Properties (filaments)

Dielectric Constant : 5.7 @ 9.375 x 10⁹ hertz
Loss Tangent (10 Ghz) : 0.015

Optical Properties (filaments)

Refractive Index : 1.616

Important Processing Information

Refrex® 1400 woven fabrics are coated during manufacture with sizings or finishes which serve as aids in textile processing. These sizings or finishes consist of organic polymers which may ignite and/or decompose to hazardous byproducts or process contaminants when first heated. Heat cleaning is available to meet your safety or process requirements.

Thermal optical properties (Courtesy-NASA)

Absorptivity : 0.15
Emissivity : 0.87